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Application of Statistical Modelling in Marketing and Advertising

Mindshare Business Planning

7-Nov-12

“Half the money I spend on advertising is wasted. The trouble is I don't know which half.”

- John Wanamaker
1895

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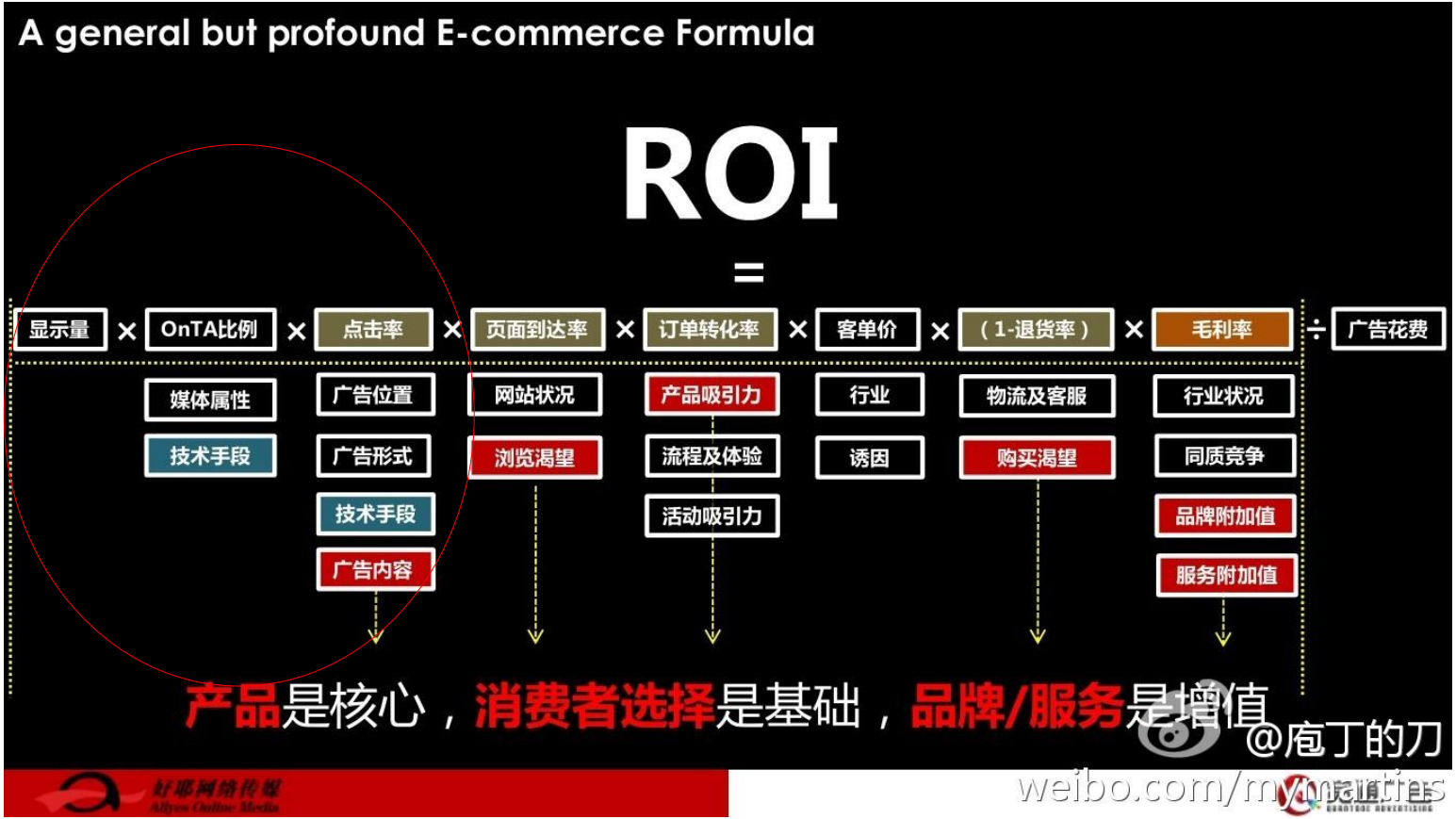
Cookie Based Attribution Modeling

It is difficult to measure ROI…



Last click is not everything

Integrated thinking rather than “swim lane” thinking

Digital analytics need to work with technology

All digital data come from cookies. Cookie = Respondent

Internet cookies are small pieces of information in text format that are downloaded to your computer when you visit a web sites. With visitor ID, cookie data create a diary of visitor's online activities (eg. clicks on an ad).

First party cookie: cookies come from web site you visited

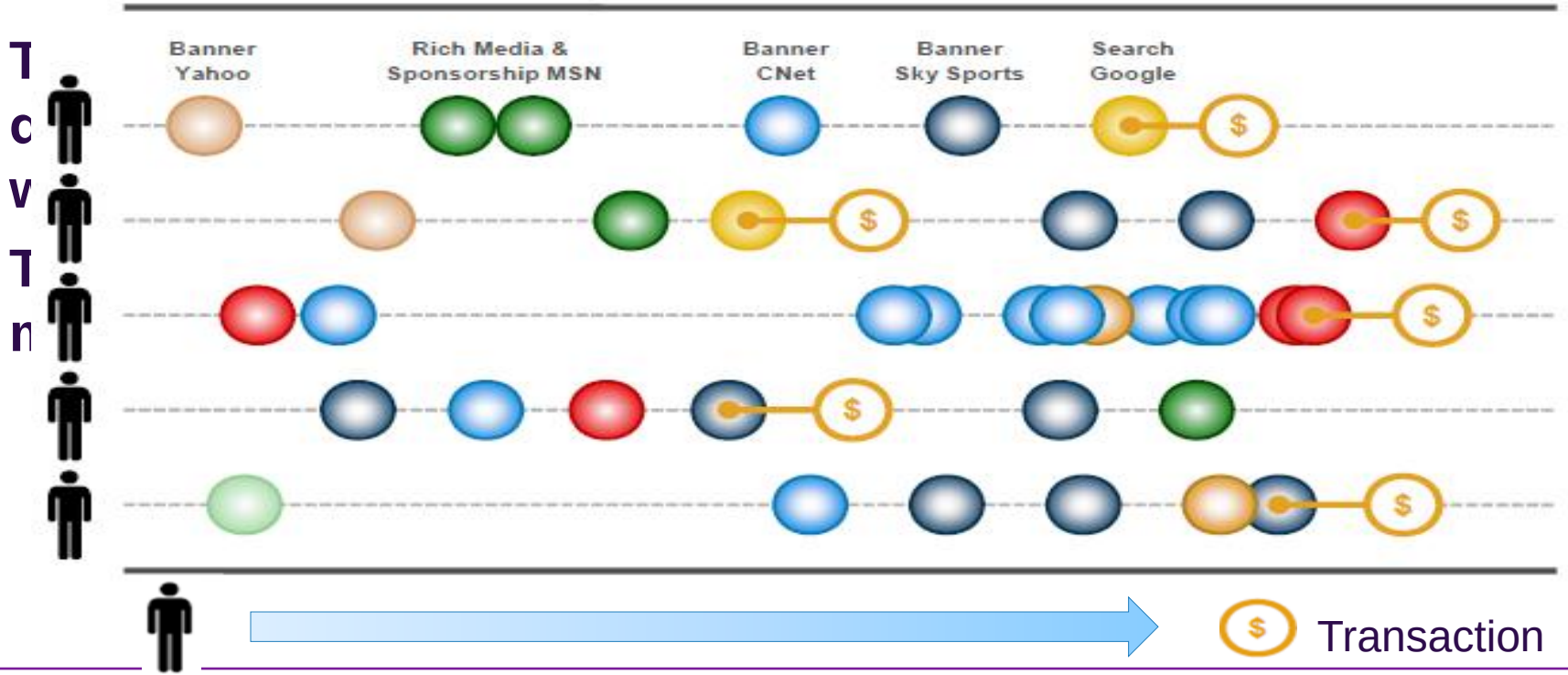
Third party cookie: cookies from ad server:

Chinese Fortune Cookie

Attribution Modeling

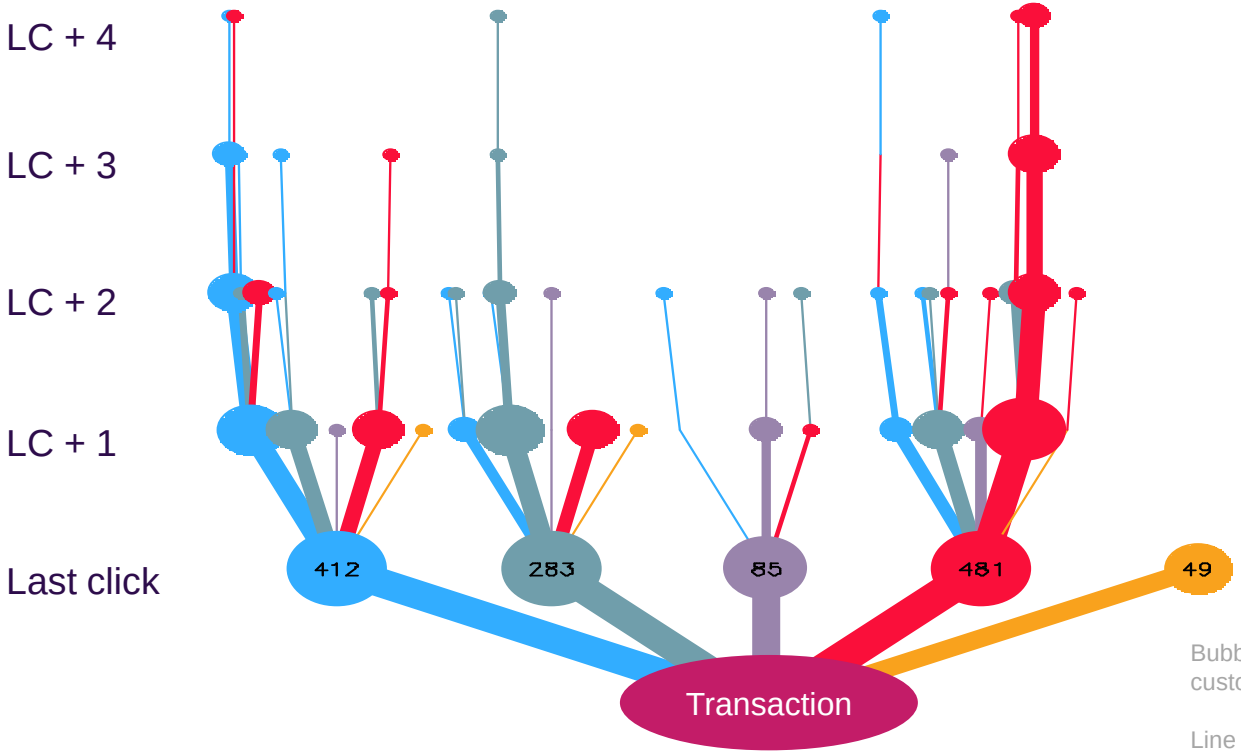
- Typical client questions to be addressed by attribution modeling:
  - Which elements have driven the conversion – was it the last click, the first click or a particular combination of clicks?
  - How can I accelerate this journey by improving the cross-channel efficiency?

Customers interact with online ads multiple times



Source: Microsoft Atlas

Attribute sales to every touch points; Not just the last



Bubble size shows number of *new* customer start their journey;

Line width shows *cumulative* traffic over a journey

Brand Search

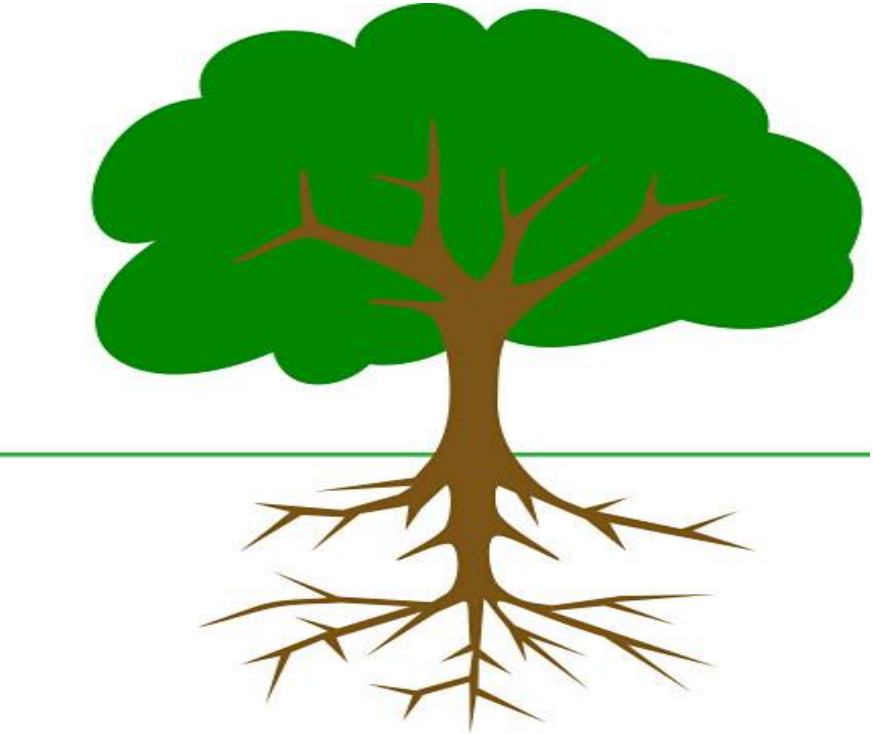
Non-brand Search

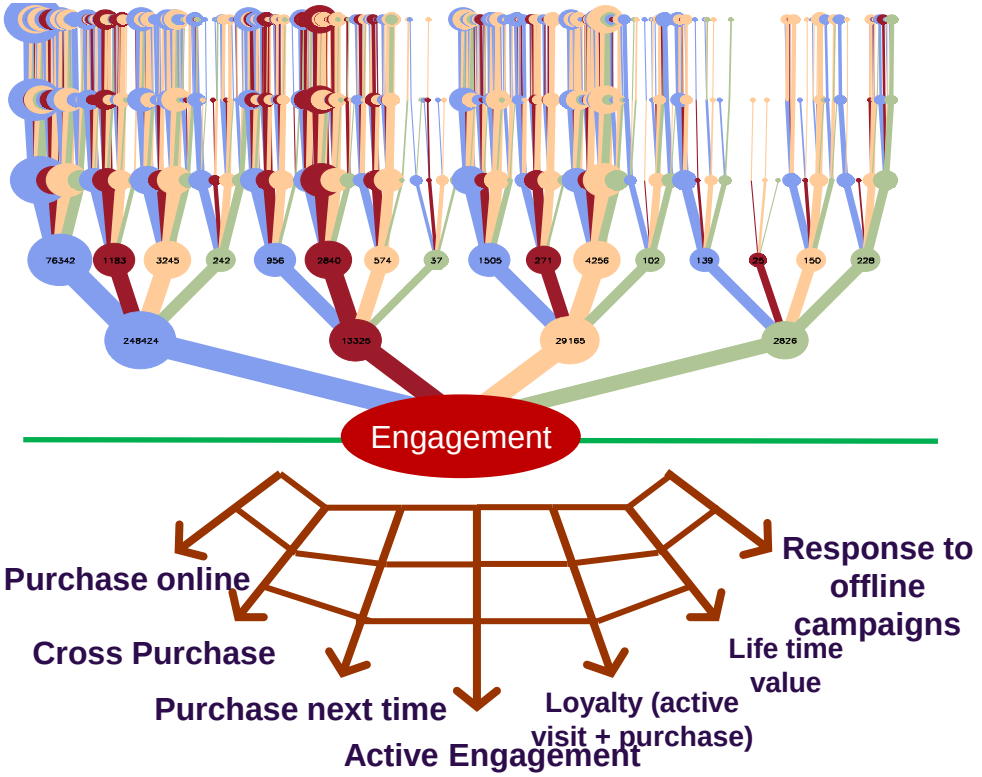
Display

Aggregator (price comparison)

Affiliate

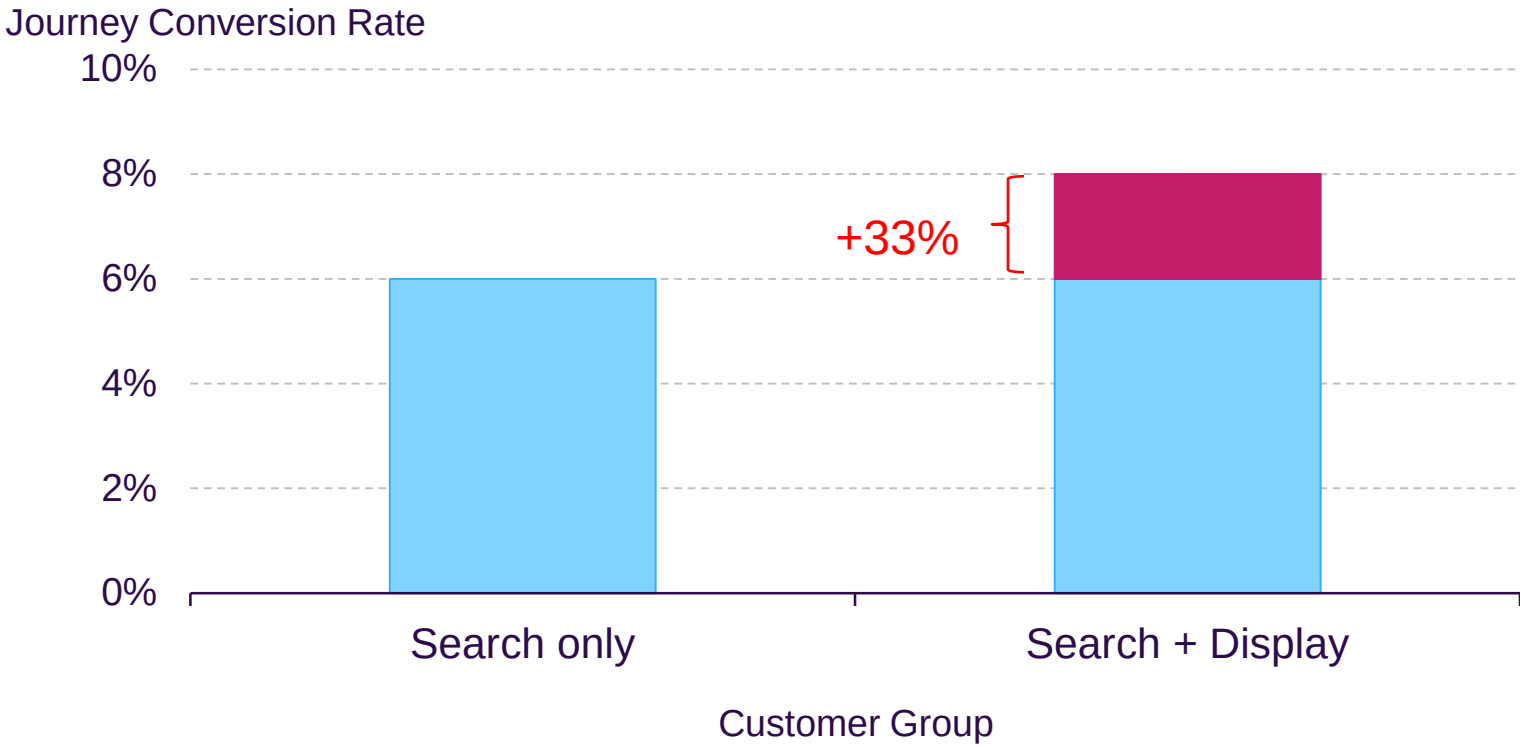
Direct click path to drive multiple business outcomes



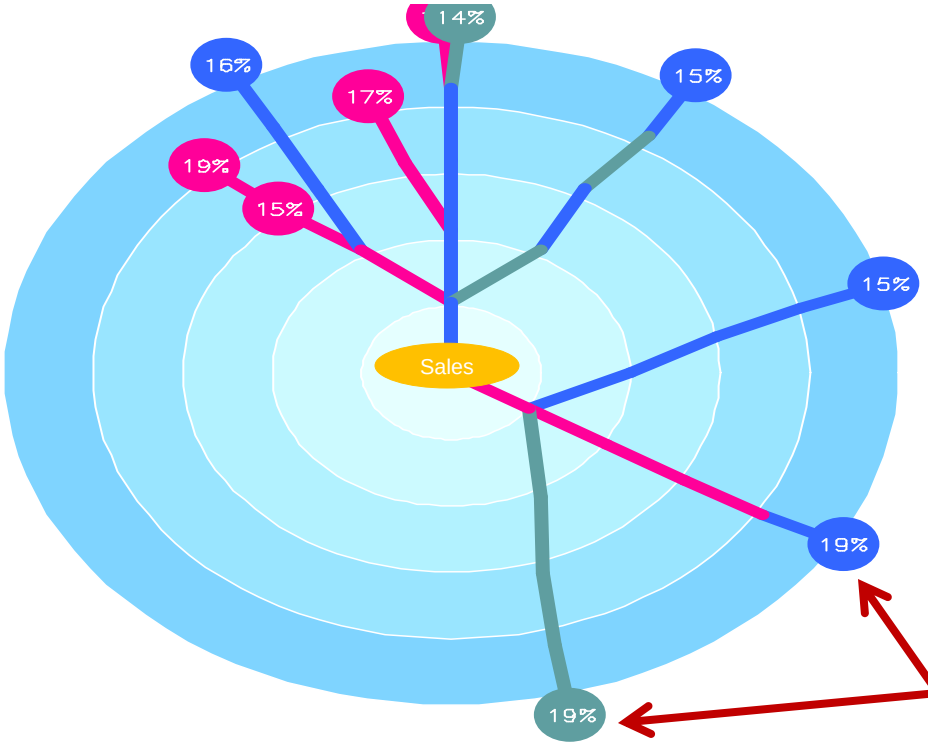


Discover synergy between online media

Customers travel across search and display are more likely to convert



Case Study: Consumers start journey further away and finish with brand terms or display

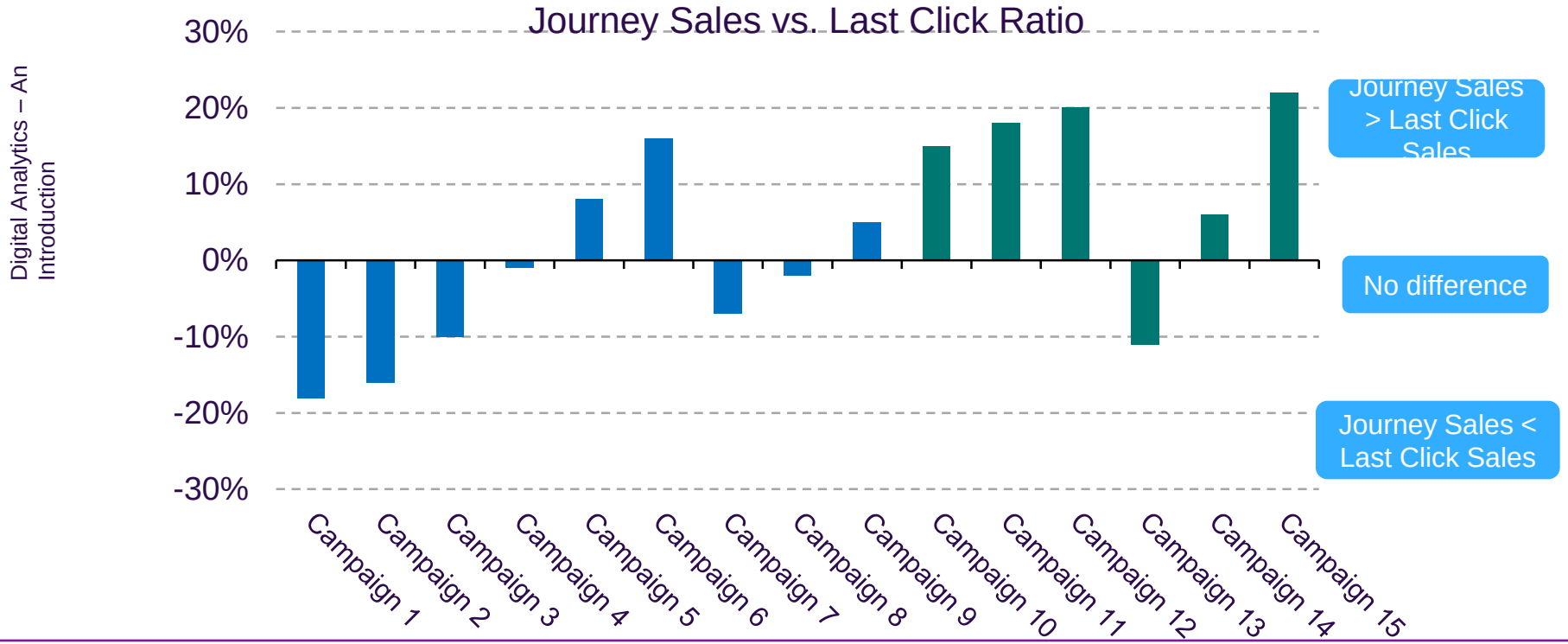


Brand PPC
Generic PPC
Display

Customers start with brand PPC or generic PPC then change to display show the highest conversion rate – 19%.

% inside bubble shows conversion rate of customers travelling on particular route.

Application Result 1: Individual media plan could gain up to extra 20% sales than we thought



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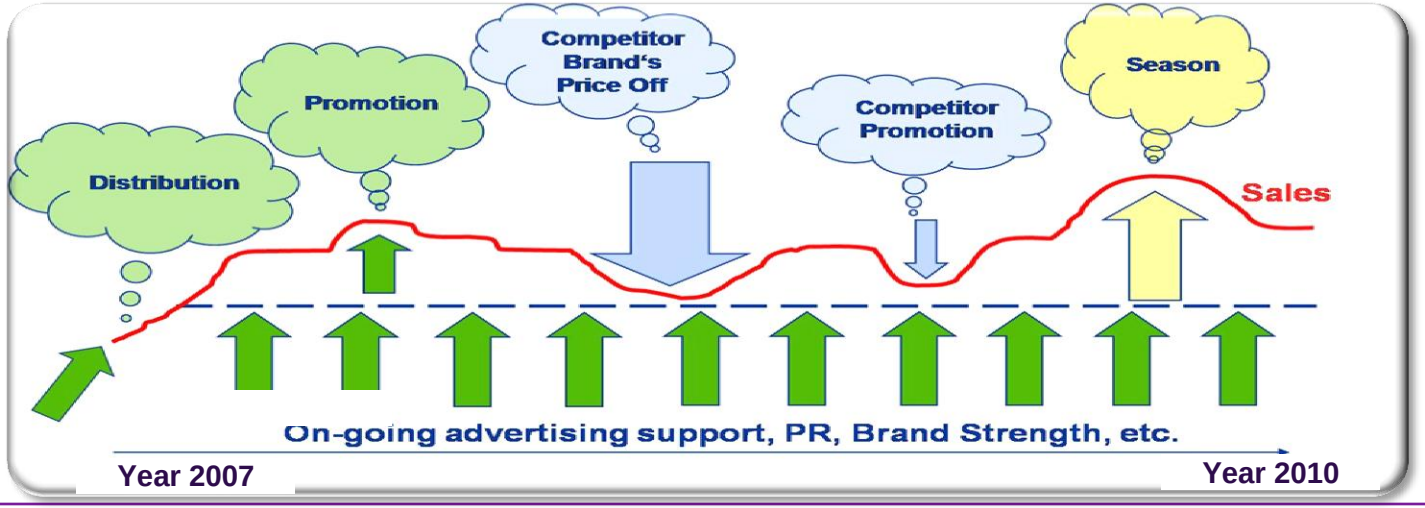
How about mass-media ?
How about offline sales?

Marketing Mix Modeling

What is Marketing Mix Modelling**?**

A brand’s volume sales constantly changes & it changes for a reason

Marketing Mix Modelling is a mathematical approach that explains how each factor drivers sales & share



Mathematical Model

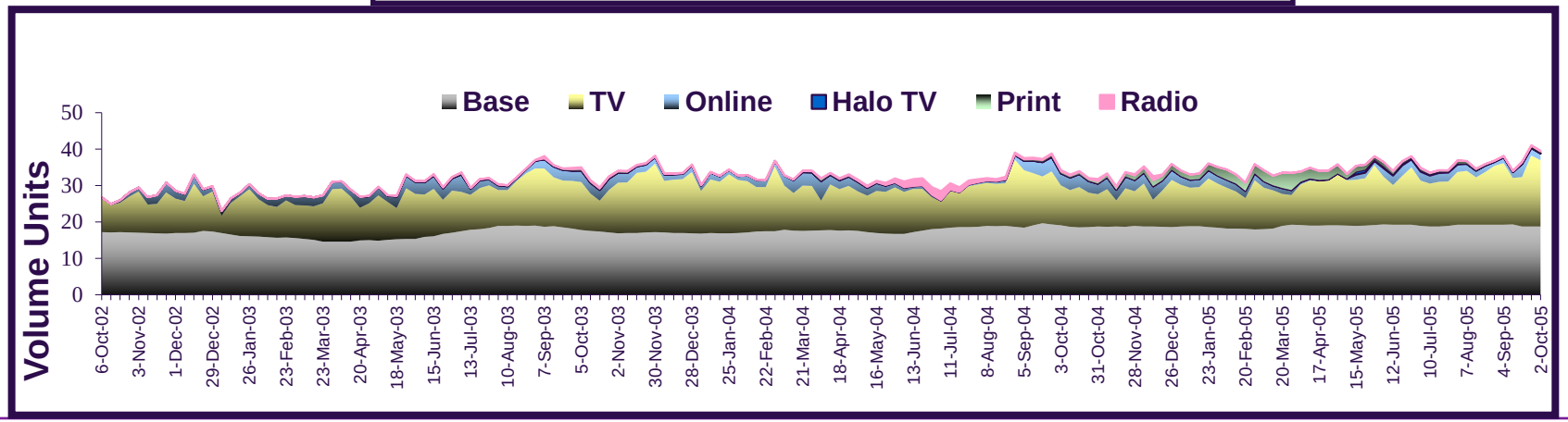
Dependent Variable

Sales (Brand metrics) = f

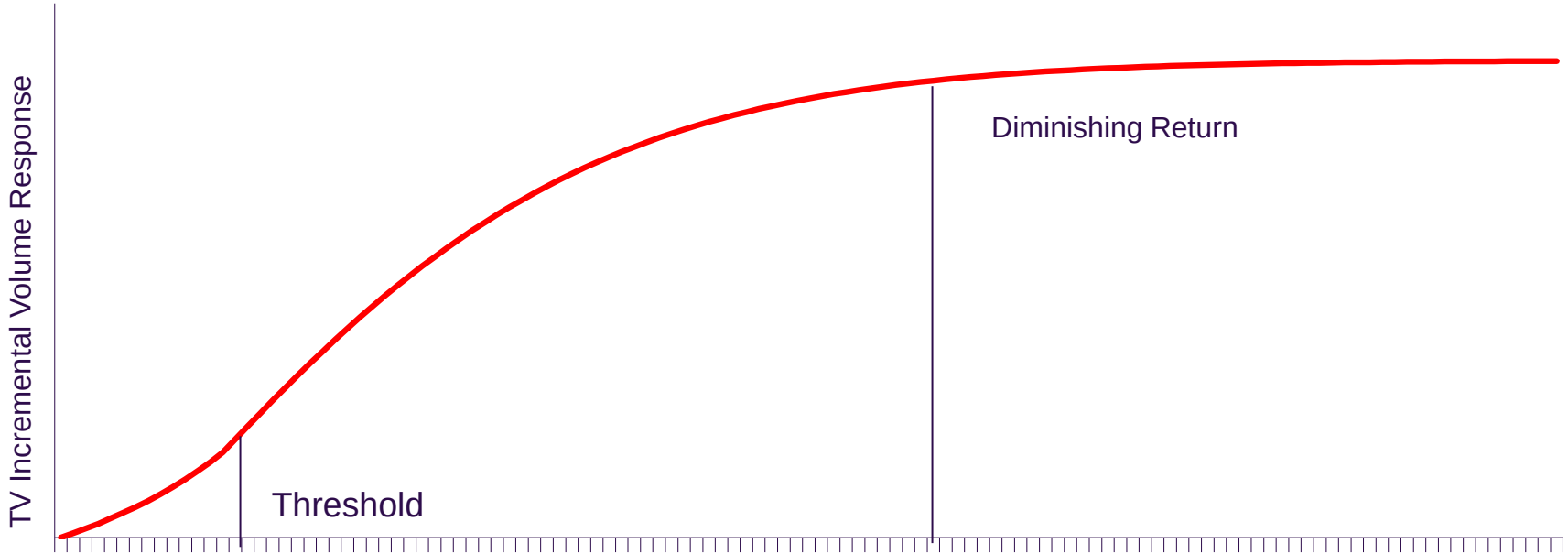
Independent variables

ATL	BTL	Distribution	Others
TV, Internet, Print, OOH	Price promotion, Sampling, gift	Number of stores, sales representative	Category Dynamics, Economic Indicators, Innovation, Competition, Seasonality

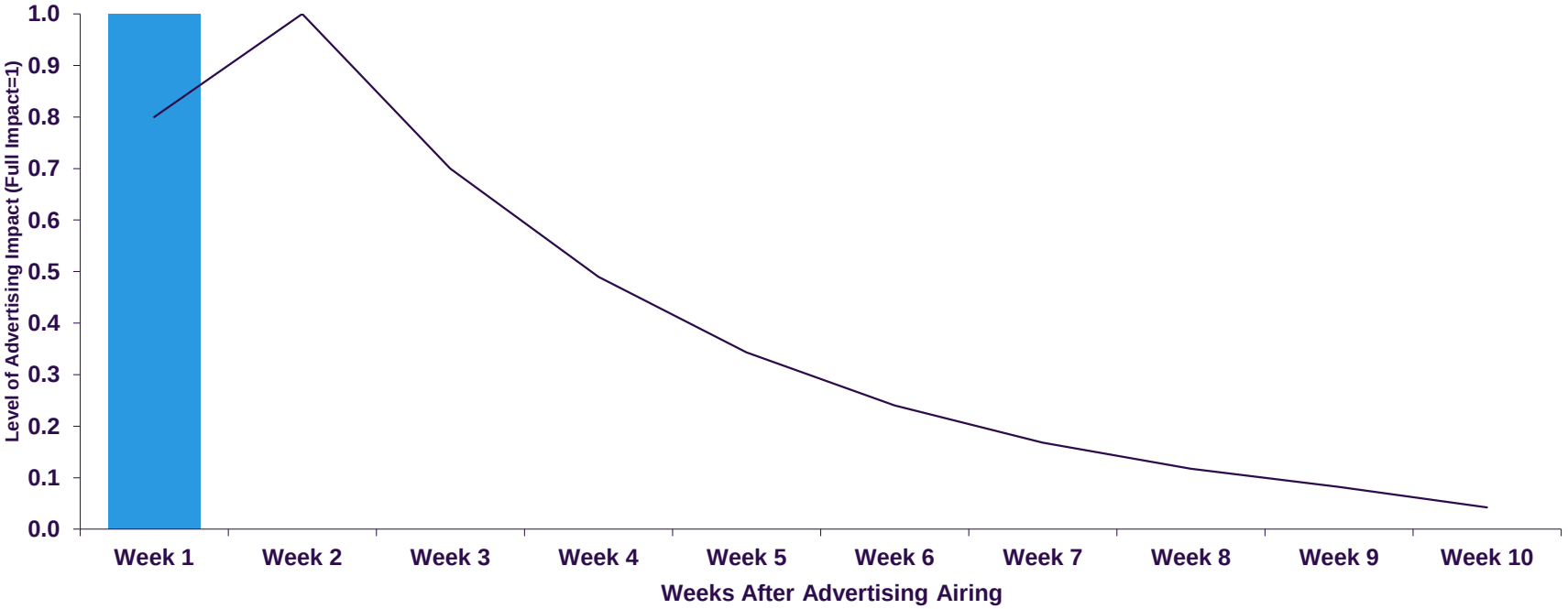
$$Y_t = \beta_0 + \Sigma \beta_\kappa f(X)_{kt} + \varepsilon_t$$



Nonlinear model



Dynamic model



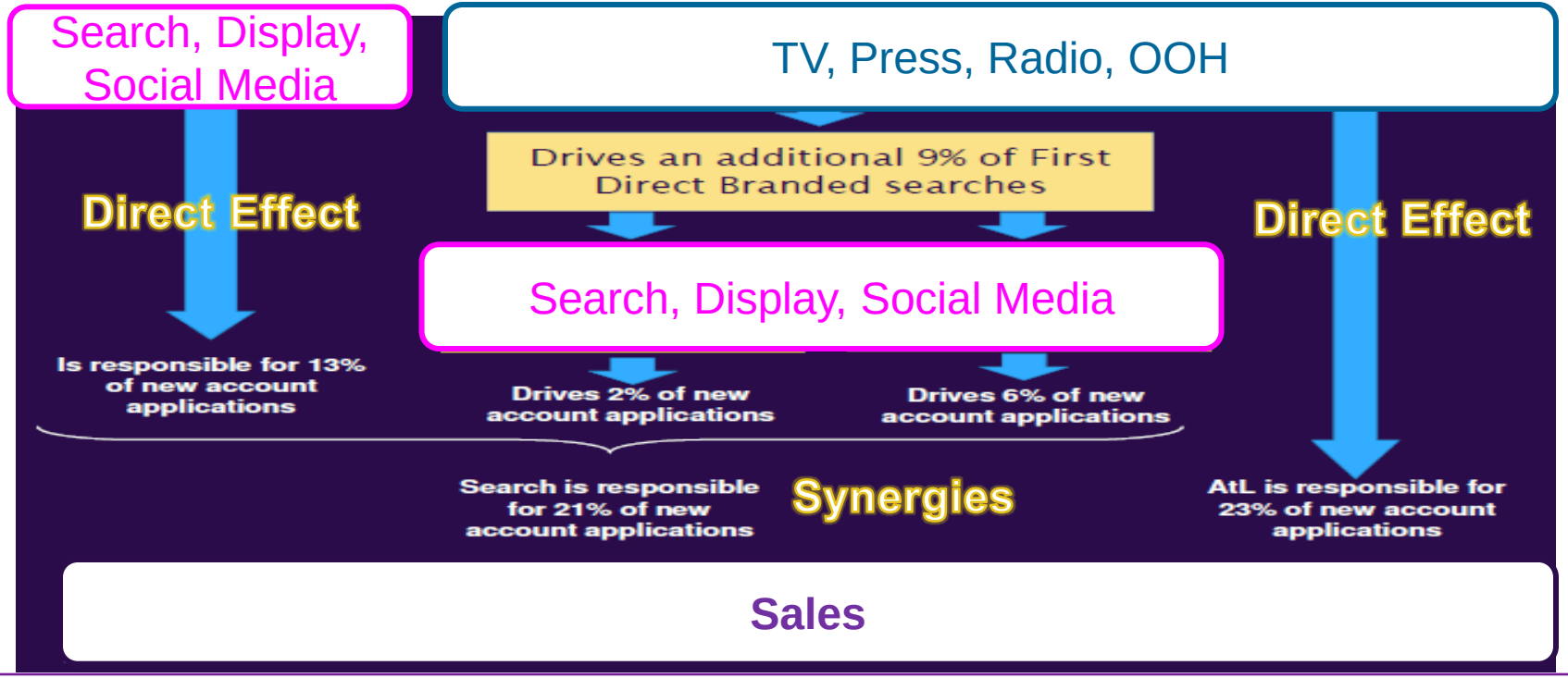
More than a simple linear regression

1. **Non-linear model**
2. **Dynamic model:**
   - incorporating lags, time (t, t-1…) and flexible adstock to include the media carry-over effect, post-promotion dip effect etc
   - Incorporating wear-in, wear-out and different stage of market development
3. **Multivariate model:**
   - Incorporating multivariate relationship between different outcomes and inputs, e.g., TV's the impact on search and social media, sales' impact on social media etc
4. **Hierarchical model:**
   - Incorporating hierarchical Bayesian model to address heterogeneity for panel data

An example: Google case

Understanding how offline and online work together to drive sales

MindShare First Direct Google Case Study

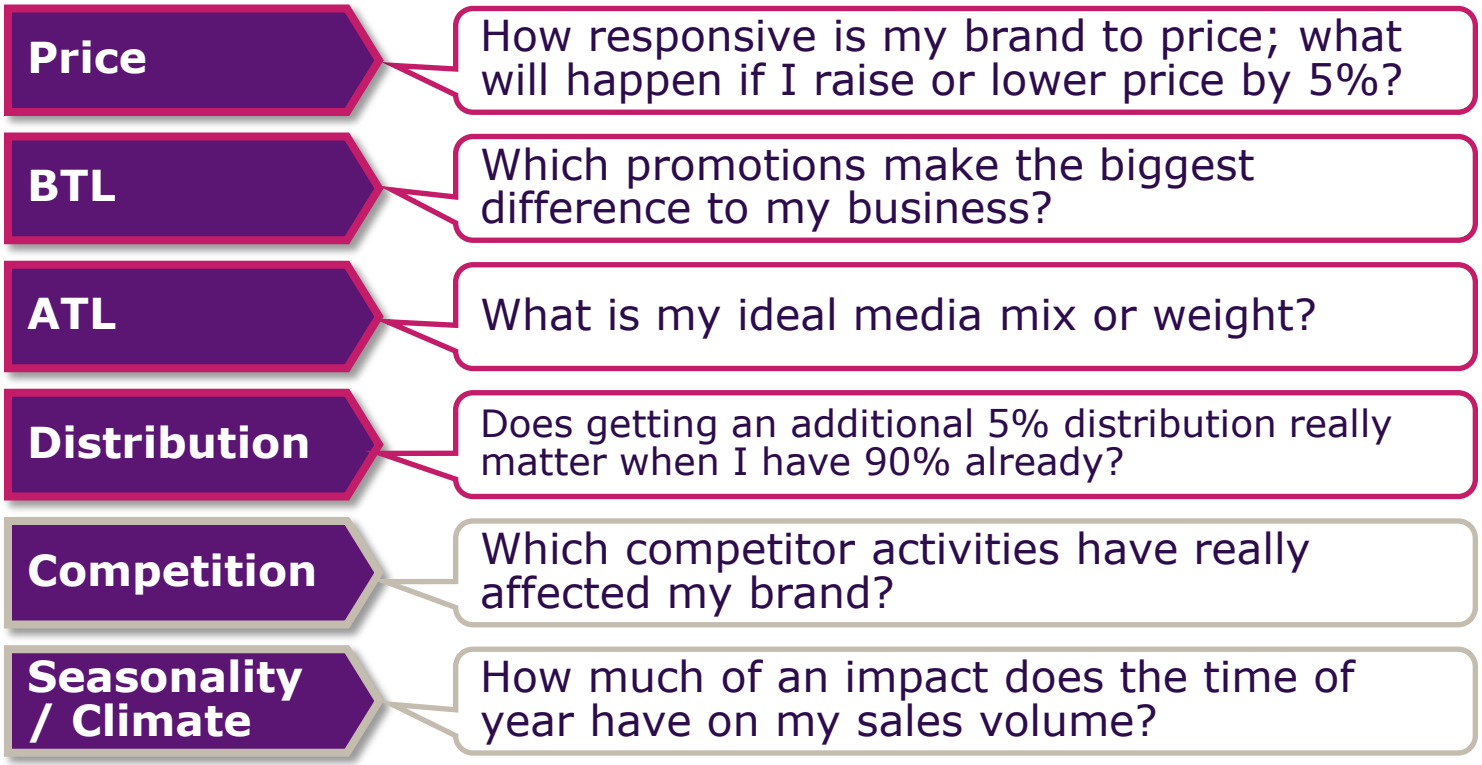


Google case study: **http://services.google.com/advertisers/uk/first-direct-case-study-final.pdf**

Superior methodology results in superior business results

1. **Much more reliable strategic recommendation and higher ROI based on accurate measurement of media effectiveness and ROI**
2. **Media expert: More actionable recommendation, e.g.,**
    1. How have cross media (especially TV, digital, OOH, PR) impacted our business? What is the synergy between them? What is the optimal mix?
    2. What is the ROI of different TV channels (PSTV, PTV and LTV), and what is the optimal mix?
    3. What are the recommended weekly/monthly GRP levels for different purpose? Threshold (minimal)? Sweet spot (between maximum marginal response and maximum ROI)? Saturation?
    4. What is optimal mix of GRP level, duration and flight pattern?
    5. What is the effectiveness by campaign/creative?
    6. What is the halo effect? What is the optimal mix of different sub-brands?
    7. How many messages/copies should be on simultaneously?
    8. What is the ROI and optimal mix of different types of message (functional vs emotional)?
    9. What is the right mix of copy lengths (15' vs 30')?
    10. What is the impact of competitors? Optimal SOV?

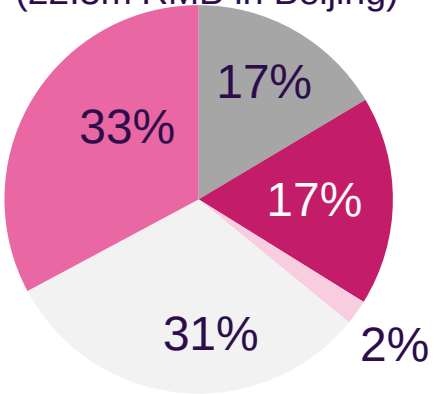
Addressing Full Marketing Mix



Product portfolio optimization

The effectiveness with which we use media can increase by 12% through a simple reallocation of current budgets

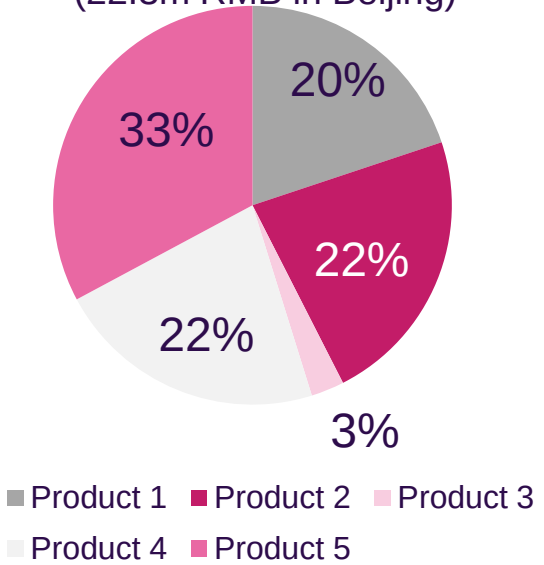
Current plan
(22.3m RMB in Beijing)



11.4% increase in unit sales from advertising and

12.1% increase in revenue from media advertising

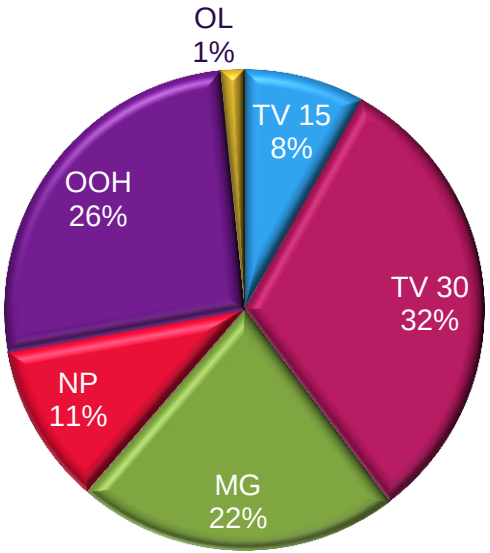
Optimized plan
(22.3m RMB in Beijing)



Media mix optimization

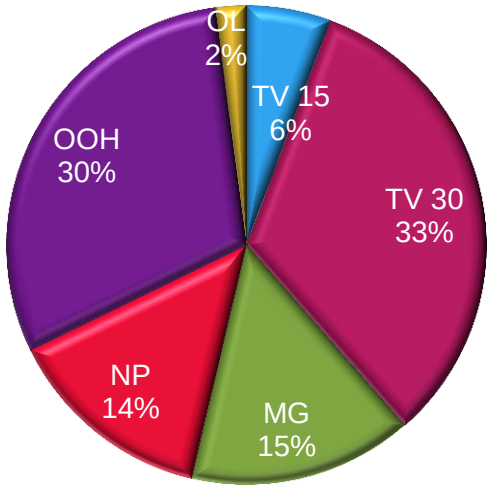
Under the same annual budget the revenue can be improved 5.7% among the incremental sales generated by media

The media adjustment range is from **-30% to +30%**

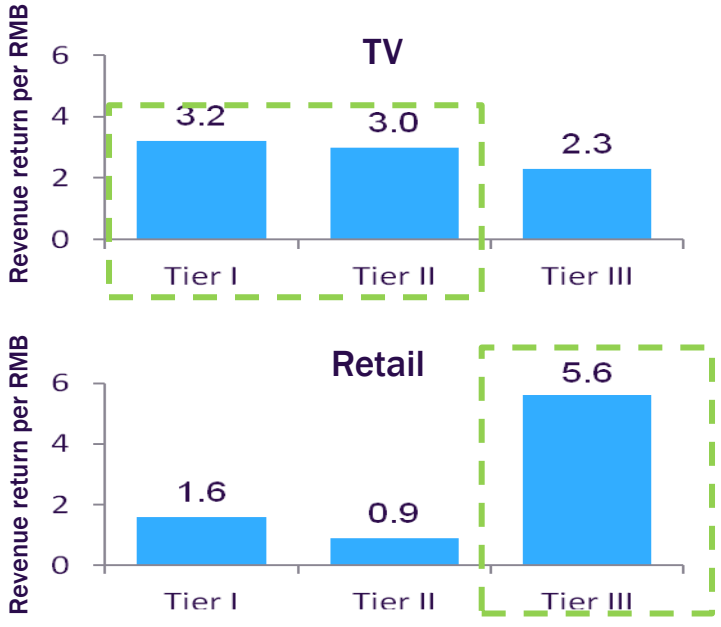


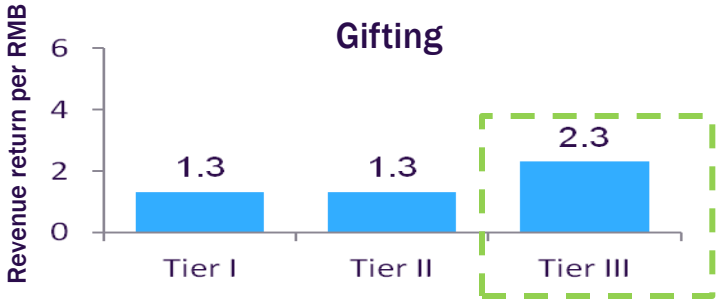
Spending optimization	
TV 15s	-30%
TV 30s	+4%
Magazine	-30%
Newspaper	+30%
OOH	+15%
Online	+30%

+5.7% in incremental sales by media



Understanding how investments work differently by Tier leads to improved planning





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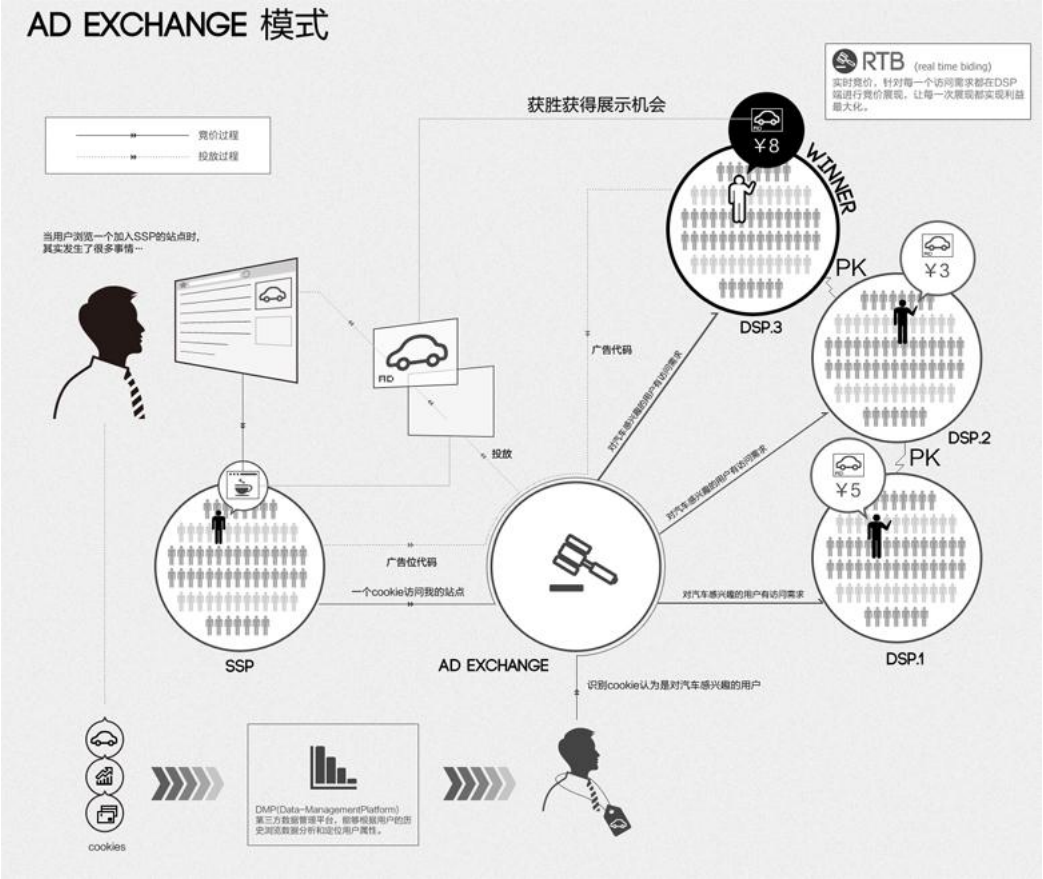
Beyond ROI

Beyond MMM

1. **Computational advertising**
   - Provide the right product and message to the right consumer in the right time through the right channel
   - Huge data mining, machine learning and optimization problem
   - Ad exchange, Real time bidding, Demand side platform
2. **Consumer and media research**
   - Know what consumer really wants and how to contact them
   - Conjoint analysis. discrete choice modeling, factor analysis, clustering, latent class modeling, structural equation modeling, graphical modeling

An example of RTB



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